



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/993,503

11/27/2001

Hoi-Sik Moon

AB-1616 US

8146

32605

7590

09/11/2008

MACPHERSON KWOK CHEN & HEID LLP

2033 GATEWAY PLACE

SUITE 400

SAN JOSE, CA 95110

EXAMINER

NGUYEN, HOAN C

ART UNIT

PAPER NUMBER

2871

MAIL DATE

DELIVERY MODE

09/11/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 09/993,503	<b>Applicant(s)</b> MOON, HOI-SIK	
	<b>Examiner</b> HOAN C. NGUYEN	<b>Art Unit</b> 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 15, 17-19 and 21-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15, 17-19 and 21-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Amendment*

Applicant's arguments with respect to claims 15, 17-19 and 21-25 based on the Response filed on 6/18/2008 have been considered but are moot in view of the new ground(s) of rejection. Therefore, this is Final action.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 15, 17, 19, 21 and 23-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Ouchi et al. (US6320691B1).

In regard to claims 15, 19 and 23, Ouchi et al. disclose (Figs. 1-4) a method for manufacturing an assembly including a printed circuit board and a plurality of tape carrier packages, each having a conductive lead thermo-compression bonded to a corresponding conductive land on the printed circuit board, the method comprising:

- arranging the tape carrier packages 20 along a common axis at respective first intervals of 0.3mm (width of 0.2mm at pitch of 0.5mm, col. 8 lines 35-38);

Art Unit: 2871

- forming a plurality of the first conductive land groups on the printed circuit board the lands being arranged along a common axis at respective second intervals of 0.25mm (width of 0.25mm at pitch of 0.5mm, col. 8 lines 40-43) determined in accordance with the thermal expansion properties of the printed circuit board such that, in a pre-compression bonded state, the respective second intervals between adjacent ones of the land groups are smaller than the respective first intervals between adjacent ones of the corresponding tape carrier packages;
- thermo-compression bonding the respective leads of the tape carrier packages to corresponding ones of the lands on the printed circuit board; and, during the thermo-compression bonding, allowing the printed circuit board to expand such that the respective lands are substantially aligned with corresponding ones of the leads of the tape carrier packages.

Claim 16:

- measuring the thermal expansion properties of the printed circuit board before forming the leads thereon

wherein

Claim 21:

- the second intervals become substantially the same as the first intervals by thermal expansion when the printed circuit board undergoes a thermo-compression bonding process.

Claim 24:

Art Unit: 2871

- the interval between the printed circuit board land groups is inherently determined by:
  - measuring an amount of total thermal expansion of the substrate under a thermo-compression bonding process, and
  - obtaining the interval between the printed circuit board land groups by considering the amount of total thermal expansion.

Claim 25:

- each conductive lead comprises a group of parallel, spaced conductive leads, and each conductive land comprises a corresponding group of parallel, spaced conductive lands.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 15, 18-19 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Conventional Art Admitted by Applicants in view of Ouchi et al. (US6320691B1).

In regard to claims 15, 19 and 23, Conventional Art Admitted by Applicants disclose (Table 1, 4-5, 8-9, 11 Figs. 1-2, 4, 8, 10-11) a method for manufacturing an assembly including a printed circuit board and a plurality of tape carrier packages, each

Art Unit: 2871

having a conductive lead thermo-compression bonded to a corresponding conductive land on the printed circuit board, the method comprising:

- arranging the tape carrier packages 20 along a common axis at respective first intervals;
- forming a plurality of the first conductive land groups on the printed circuit board the lands being arranged along a common axis and disposed parallel to and spaced apart from each other at respective second intervals determined in accordance with the thermal expansion properties of the printed circuit board such that, in a pre-compression bonded state,
- thermo-compression bonding the respective leads of the tape carrier packages to corresponding ones of the lands on the printed circuit board; and, during the thermo-compression bonding, allowing the printed circuit board to expand such that the respective lands are substantially aligned with corresponding ones of the leads of the tape carrier packages.

wherein

Claims 18 and 22:

- the respective second intervals between adjacent ones of the land groups are asymmetric with respect to a line passing through the middle of a width of the printed circuit board when the printed circuit board is asymmetric with respect to said line.

Art Unit: 2871

However, Conventional Art Admitted by Applicants fails to disclose the respective second intervals between adjacent ones of the lands to be smaller than the respective first intervals between adjacent ones of the corresponding tape carrier package leads.

Ouchi et al. teach the respective second intervals of 0.25 mm (width of 0.25 mm at pitch of 0.5 mm, col. 8 lines 40-43) between adjacent ones of the lands being smaller than the respective first intervals of 0.3 mm (width of 0.2 mm at pitch of 0.5 mm, col. 8 lines 35-38) between adjacent ones of the corresponding tape carrier packages.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a method for manufacturing an assembly including a printed circuit board and a plurality of tape carrier packages as Conventional Art Admitted by Applicants disclosed with the respective second intervals between adjacent ones of the land groups to be smaller than the respective first intervals between adjacent ones of the corresponding tape carrier package leads for good connecting with accuracy (col. 8 lines 48-51) as Ouchi et al. taught.

### ***Response to Arguments***

Applicant's arguments filed on 6/20/2008 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are follows:

A. Unlike the present invention, the input leads 9 of Ouchi et al.'s TCPs are disposed perpendicular to the output leads 6 thereof, and accordingly, the

Art Unit: 2871

corresponding lands 11 of the PCB 5 are also disposed perpendicular to the output leads. (See, Ouichi, Fig. 2). This is contrary to the limitation of claim 15 of the present invention that the land groups, and hence the lands, of the PCB be arranged a common axis.

B. Ouichi et al. teach an altogether different technique for addressing the problem, namely, cooling the PCB board 104 from the TCP side with cooling air from a nozzle 108 during the thermocompression bonding procedure. ('691, Fig. 8, col. 9, lines 15-44; col. 9, lines 55-67, col. 10, lines 1-21.)

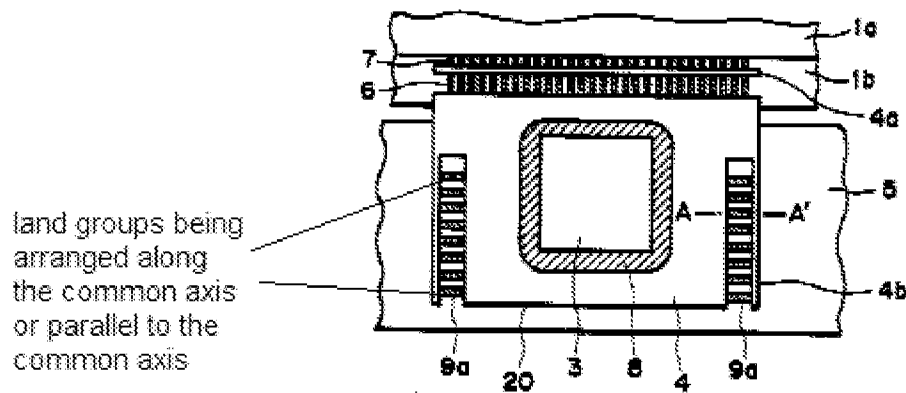
C. There is no teaching or suggestion anywhere in Ouichi et al. for the technique taught by the present invention, namely, "pre-shrinking" the PCB such that the PCB lands are placed closer together than the corresponding TCP leads before thermocompression bonding, and such that, during the thermocompression bonding, the printed circuit board expands such that the respective lands are substantially aligned with corresponding ones of the leads of the TCPs. In fact, since Ouichi et al. teach the importance of ensuring that the TCP leads be precisely aligned with the corresponding PCB lands prior to thermocompression bonding, it is respectfully submitted that Ouichi et al. teach directly away from the present invention.

Examiner's responses to Applicants' ONLY arguments are follows:

A. All claims did not clearly cite the output leads and lands of the PCB must be arranged along a common axis. Therefore, this argument is irrelevant.



However, the limitation of claim 15 of the present invention that the land groups, and hence the lands, of the PCB be arranged a common axis or parallel to the common axis.



**FIG. 2**

B. All claims did not clearly cite the different technique, which disclosed in specification, for addressing the problem, namely, cooling the PCB board from the TCP side. Therefore, this argument is irrelevant.

C. During the thermocompression bonding inherently with heat the printed circuit board expands such that the respective lands are substantially aligned with corresponding ones of the leads of the TCPs so that allowing the lands of the PCB substantially aligning with corresponding ones of the leads of TCPs after thermocompression bonding. Therefore, Ouichi et al. must inherently use the "pre-shrinking" PCB such that the PCB lands are inherently placed closer together than the corresponding TCP leads before thermocompression bonding.

In the conventional prior art, any PCB inherently has property of "pre-shrinking", which always will expands during thermocompression bonding with heat.

### ***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (571)272-2296. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

Art Unit: 2871

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HOAN C. NGUYEN  
Examiner  
Art Unit 2871

Chn

/Andrew Schechter/  
Primary Examiner, Art Unit 2871